Supplementary Material

Title:

Association between hyperlipidemia and mortality after incident acute myocardial infarction or acute decompensated heart failure: A propensity score matched cohort study and a meta-analysis

Study coauthors:

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SEARCH STRATGY

Ovid search strategy

Database(s): Embase 1988 to 2018 Week 08, EBM Reviews - Cochrane Central Register of Controlled Trials January 2018, Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) 1946 to Present
Search Strategy:

#	Searches	Results
1	exp Myocardial Infarction/	464828
2	exp heart infarction/	293249
3	(("coronary arter*" adj3 occlusion) or (heart adj2 (infarct* or necrosis)) or "cardiac infarct*" or "cardial infarct*" or "cardiogenic shock" or "dressler syndrome" or "heart attack*" or "myocardial infarct*" or "myocardial stunning" or "myocardium infarct*" or "premonitory infarction sign" or "subendocardial infarct*").ti,ab,hw,kw.	606258
4	1 or 2 or 3	608529
5	acute.ti,ab,hw,kw. and 4	239685
6	exp Heart Failure/	498877
7	(((heart or cardiac or myocardial) adj2 (failure or decompensat* or insufficienc* or incompetence)) or "cardio-renal syndrome*" or "cardiorenal syndrome*" or "paroxysmal dyspnea*" or "decompensatio cordis" or "insufficientia cardis").ti,ab,hw,kw.	519250
8	6 or 7	633042
9	exp Pneumonia/	313860
10	("acute chest syndrome" or Bronchopneumonia* or "inflammatory lung disease*" or lobitis or "lung inflammation*" or pleuropneumonia* or pleuropneumonitis or "pneumonia pleuritica" or "pneumonia superficialis" or pneumonia* or "pneumonic lung*" or "pneumonic pleurisy" or "pneumonic pleuritis" or pneumonitides or pneumonitis or "pulmonal inflammation*" or "pulmonary inflammation*" or "pulmonic inflammation*").ti,ab,hw,kw.	533949
11	9 or 10	549542
12	5 or 8 or 11	1350218
13	exp Hyperlipidemias/	192450
14	("Buerger Gruetz syndrome" or "Burger Grutz syndrome" or cholesteremia* or cholesterinemia* or cholesterolemia* or "familial hyperbetalipoproteinaemia*" or "familial hyperbetalipoproteinemia*" or "familial hypercholesterolemic xanthomatos*" or "familial hyperlipoproteinaemia type ii" or "familial hyperlipoproteinemia type ii" or "harbitz mueller syndrome" or "hyper low density lipoproteinaemia*" or "hyper low density lipoproteinemia*" or hyperbetalipoproteinaemia* or hyperbetalipoproteinemia* or hypercholesteremia* or hypercholesterinaemia* or hypercholesterinemia* or hypercholesterolaemia* or "hypercholesterolaemic xanthomatos*" or hypercholesterolemia* or "hypercholesterolemic xanthomatos*" or hyperlipaemia* or hyperlipemia* or hyperlipidaemia* or hyperlipidemia* or hyperlipidemic or hyperlipoproteinaemia* or hyperlipoproteinemia* or hypertriglyceridaemia* or hypertriglyceridemia* or "hypertriglyceridemic waist" or "ldl receptor disorder" or lipaemia* or lipemia* or lipidaemia* or lipidemia* or "lipoid gout" or "mckusick 14389" or "mckusick 14430" or "mckusick 14440" or "mckusick 14575" or "tendinous xanthogranulomatos*" or "tendinous xanthomatos*" or "tendon xanthogranulomatos*" or "triglyceride storage disease" or triglyceridemia* or "xanthogranulomatosis tendinosum" or "xanthogranulomatosis tendinous" or	252850

	"xanthoma tendinosum" or "xanthoma tuberosum" or "xanthoma tuberosum multiplex").ti,ab,hw,kw.	
15	exp Hydroxymethylglutaryl-CoA Reductase Inhibitors/tu, dt	80348
16	(Atorvastatin* or bervastatin* or cerivastatin* or compactin* or crilvastatin* or dalvastatin* or fluindostatin* or glenvastatin* or "HMG CoA reductase inhibitor" or "hmg coenzyme a reductase inhibitor" or "hmg-coa reductase inhibitor" or "hydroxymethylglutaryl coa reductase inhibitor" or "hydroxymethylglutaryl coenzyme A reductase inhibitor" or "hydroxymethylglutaryl-coa inhibitor" or "hydroxymethylglutaryl-coa reductase inhibitor" or "hydroxymethylglutaryl-coenzyme a inhibitor" or Lovastatin* or Meglutol or mevinolin* or "mevinolinic acid" or "monacolin J" or "monacolin L" or pitavastatin* or Pravastatin* or rosuvastatin* or Simvastatin* or statin* or statins or tenivastatin* or vastatin*).ti,ab,hw,kw.	208226
17	Dyslipidemias/	20270
18	(dyslipidemia or dyslipoproteinemia).ti,ab,hw,kw.	92147
19	or/13-18	481133
20	12 and 19	47704
21	exp survival/	902536
22	exp death/	717663
23	exp mortality/	1191292
24	mortality.fs.	506650
25	exp survival analysis/	274790
26	(surviv* or death* or mortalit* or fatalit*).ti,ab,hw,kw.	5314876
27	or/21-26	5623459
28	20 and 27	24286
29	(exp animals/ or exp nonhuman/) not exp humans/	8998409
30	((alpaca or alpacas or amphibian or amphibians or animal or animals or antelope or armadillo or armadillos or avian or baboon or baboons or beagle or beagles or bee or bees or bird or birds or bison or bovine or buffalo or buffaloes or buffalos or "c elegans" or "Caenorhabditis elegans" or camel or camels or canine or canines or carp or cats or cattle or chick or chicken or chickens or chicks or chimp or chimpanze or chimpanzees or chimps or cow or cows or "D melanogaster" or "dairy calf" or "dairy calves" or deer or dog or dogs or donkey or donkeys or drosophila or "Drosophila melanogaster" or duck or duckling or ducklings or ducks or equid or equids or equine or equines or feline or felines or ferret or ferrets or finch or finches or fish or flatworm or flatworms or fox or foxes or frog or frogs or "fruit flies" or "fruit fly" or "G mellonella" or "Galleria mellonella" or geese or gerbil or gerbils or goat or goats or goose or gorilla or gorillas or hamster or hamsters or hare or hares or heifer or heifers or horse or horses or insect or insects or jellyfish or kangaroo or kangaroos or kitten or kittens or lagomorph or lagomorphs or lamb or lambs or llama or llamas or macaque or macaques or macaw or macaws or marmoset or marmosets or mice or minipig or minipigs or mink or minks or monkey or monkeys or mouse or mule or mules or nematode or nematodes or octopus or octopuses or orangutan or "orang-utan" or orangutans or "orang-utans" or oxen or parrot or parrots or pig or pigeon or pigeons or piglet or piglets or pigs or porcine or primate or primates or quail or rabbit or rabbits or rat or rats or reptile or reptiles or rodent or rodents or ruminant or ruminants or salmon or sheep or shrimp or slug or slugs or swine or tamarin or tamarins or toad or toads or trout or urchin or urchins or vole or voles or waxworm or waxworms or worm or worms or xenopus or "zebra fish" or zebrafish) not (human or humans or patient or patients)).ti,ab,hw,kw.	7727415
31	28 not (29 or 30)	23991

32	limit 31 to english language	22671
33	limit 32 to (conference abstract or editorial or erratum or note or addresses or autobiography or bibliography or biography or blogs or comment or dictionary or directory or interactive tutorial or interview or lectures or legal cases or legislation or news or newspaper article or overall or patient education handout or periodical index or portraits or published erratum or video-audio media or webcasts) [Limit not valid in Embase,CCTR,Ovid MEDLINE(R),Ovid MEDLINE(R) Daily Update,Ovid MEDLINE(R) In-Process,Ovid MEDLINE(R) Publisher; records were retained]	4951
34	32 not 33	17720
35	exp controlled study/	5856381
36	exp Randomized Controlled Trial/	924372
37	exp triple blind procedure/	179
38	exp Double-Blind Method/	405536
39	exp Single-Blind Method/	72408
40	exp latin square design/	348
41	exp Placebos/	330956
42	exp Placebo Effect/	10111
43	exp comparative study/	2771403
44	exp intervention studies/	34956
45	exp Cross-Sectional Studies/	500737
46	exp Cross-Over Studies/	128902
47	exp Cohort Studies/	2186646
48	exp longitudinal study/	344882
49	exp retrospective study/	1277886
50	exp prospective study/	963919
51	exp clinical trial/	2029131
52	clinical study/	106532
53	exp case-control studies/	1046859
54	exp confidence interval/	162834
55	exp multivariate analysis/	475730
56	((control* adj3 study) or (control* adj3 trial) or (randomized adj3 study) or (randomized adj3 trial) or (randomised adj3 study) or (randomised adj3 trial) or "pragmatic clinical trial" or (random* adj1 allocat*) or (doubl* adj blind*) or (doubl* adj mask*) or (singl* adj blind*) or (singl* adj mask*) or (tripl* adj blind*) or (tripl* adj mask*) or (trebl* adj blind*) or (trebl* adj mask*) or "latin square" or placebo* or nocebo* or multivariate or "comparative study" or "comparative survey" or "comparative analysis" or (intervention* adj2 study) or (intervention* adj2 trial) or "cross-sectional study" or "cross-sectional analysis" or "cross-sectional survey" or "cross-sectional design" or "prevalence study" or "prevalence analysis" or "prevalence survey" or "disease frequency study" or "disease frequency analysis" or "disease frequency survey" or crossover or "cross-over" or cohort* or "longitudinal study" or "longitudinal survey" or "longitudinal analysis" or "longitudinal evaluation" or longitudinal* or ((retrospective or "ex post facto") adj3 (study or survey or analysis or design)) or retrospectiv* or "prospective study" or "prospective survey" or "prospective analysis" or prospectiv* or "concurrent study" or "concurrent survey" or "concurrent analysis" or "clinical study" or "clinical trial" or "case control study" or "case base study" or "case referrent study" or "case referent study" or "case referent study" or	18012184

	"case compeer study" or "case comparison study" or "matched case control" or "multicenter study" or "multi-center study" or "odds ratio" or "confidence interval" or "change analysis" or ((study or trial or random* or control*) and compar*)).mp,pt.	
57	or/35-56	18453897
58	34 and 57	14467
59	exp *Hyperlipidemias/ or exp *Hydroxymethylglutaryl-CoA Reductase Inhibitors/tu, dt or *Dyslipidemias/ or ("Buerger Gruetz syndrome" or "Burger Grutz syndrome" or cholesteremia* or cholesterinemia* or cholesterolemia* or "familial hyperbetalipoproteinaemia*" or "familial hyperbetalipoproteinemia*" or "familial hypercholesterolemic xanthomatos*" or "familial hyperlipoproteinaemia type ii" or "familial hyperlipoproteinemia type ii" or "harbitz mueller syndrome" or "hyper low density lipoproteinaemia*" or "hyper low density lipoproteinemia*" or hyperbetalipoproteinaemia* or hyperbetalipoproteinemia* or hypercholesteremia* or hypercholesterinaemia* or hypercholesterinemia* or hypercholesterolaemia* or "hypercholesterolaemic xanthomatos*" or hypercholesterolemia* or "hypercholesterolemic xanthomatos*" or hyperlipaemia* or hyperlipemia* or hyperlipidaemia* or hyperlipidemia* or hyperlipidemic or hyperlipoproteinaemia* or hyperlipoproteinemia* or hypertriglyceridaemia* or hypertriglyceridemia* or "hypertriglyceridemic waist" or "ldl receptor disorder" or lipaemia* or lipemia* or lipidaemia* or lipidemia* or "lipoid gout" or "mckusick 14389" or "mckusick 14430" or "mckusick 14440" or "mckusick 14575" or "tendinous xanthogranulomatos*" or "tendinous xanthomatos*" or "tendon xanthogranulomatos*" or "triglyceride storage disease" or triglyceridemia* or "xanthogranulomatosis tendinosum" or "xanthogranulomatosis tendinous" or "xanthoma tendinosum" or "xanthoma tuberosum" or "xanthoma tuberosum multiplex" or (Atorvastatin* or bervastatin* or cerivastatin* or compactin* or crilvastatin* or dalvastatin* or fluindostatin* or glenvastatin* or "HMG CoA reductase inhibitor" or "hmg coenzyme a reductase inhibitor" or "hmg-coa reductase inhibitor" or "hydroxymethylglutaryl coa reductase inhibitor" or "hydroxymethylglutaryl coenzyme A reductase inhibitor" or "hydroxymethylglutaryl-coa inhibitor" or "hydroxymethylglutaryl-coa reductase inhibitor" or "hydroxymethylglutaryl-coenzyme a inhibitor" or Lovastatin* or Meglutol or mevinolin* or "mevinolinic acid" or "monacolin J" or "monacolin L" or pitavastatin* or Pravastatin* or rosuvastatin* or Simvastatin* or statin* or statins or tenivastatin* or vastatin*) or (dyslipidemia or dyslipoproteinemia)).ti.	170773
60	exp *Myocardial Infarction/ or exp *heart infarction/ or exp *Heart Failure/ or exp *Pneumonia/ or (("coronary arter*" adj3 occlusion) or (heart adj2 (infarct* or necrosis)) or "cardiac infarct*" or "cardial infarct*" or "cardiogenic shock" or "dressler syndrome" or "heart attack*" or "myocardial infarct*" or "myocardial stunning" or "myocardium infarct*" or "premonitory infarction sign" or "subendocardial infarct*" or (((heart or cardiac or myocardial) adj2 (failure or decompensat* or insufficienc* or incompetence)) or "cardio-renal syndrome*" or "cardiorenal syndrome*" or "paroxysmal dyspnea*" or "decompensatio cordis" or "insufficientia cardis") or ("acute chest syndrome" or Bronchopneumonia* or "inflammatory lung disease*" or lobitis or "lung inflammation*" or pleuropneumonia* or pleuropneumonitis or "pneumonia pleuritica" or "pneumonia superficialis" or pneumonia* or "pneumonic lung*" or "pneumonic pleurisy" or "pneumonic pleuritis" or pneumonitides or pneumonitis or "pulmonal inflammation*" or "pulmonary inflammation*" or "pulmonic inflammation*")).ti.	716170
61	58 and (59 or 60)	6960
62	limit 61 to yr="2013 -Current"	2705
63	remove duplicates from 62	2017
64	61 not 62	4255
65	remove duplicates from 64	3291

66 63 or 65	5308
67 5 and 66	2924
68 from 67 keep 1-1890	1890
69 from 68 keep 1-1000	1000
70 from 68 keep 1001-1890	890
71 from 67 keep 1950-2924	975
72 from 67 keep 1891-1949	59
73 66 not 67	2384
74 8 and 73	2199
75 from 74 keep 1-1654	1654
76 from 75 keep 1-1000	1000
77 from 75 keep 1001-1654	654
78 from 74 keep 1655-1710	56
79 from 74 keep 1711-2199	489
80 73 not 74	185
81 from 80 keep 1-100	100
82 from 80 keep 111-185	75
83 from 80 keep 101-110	10

Scopus search strategy

1 TITLE(("coronary arter*" W/3 occlusion) or (heart W/2 (infarct* or necrosis)) or "cardiac infarct*" or "cardial infarct*" or "cardiogenic shock" or "dressler syndrome" or "heart attack*" or "myocardial infarct*" or "myocardial stunning" or "myocardium infarct*" or "premonitory infarction sign" or "subendocardial infarct*") AND TITLE-ABS-KEY(acute)

2 TITLE(((heart or cardiac or myocardial) W/2 (failure or decompensat* or insufficienc* or incompetence)) or "cardio-renal syndrome*" or "cardiorenal syndrome*" or "paroxysmal dyspnea*" or "decompensatio cordis" or "insufficientia cardis")

3 TITLE("acute chest syndrome" or Bronchopneumonia* or "inflammatory lung disease*" or lobitis or "lung inflammation*" or pleuropneumonia* or pleuropneumonitis or "pneumonia pleuritica" or "pneumonia superficialis" or pneumonia* or "pneumonic lung*" or "pneumonic pleurisy" or "pneumonic pleuritis" or pneumonitides or pneumonitis or "pulmonal inflammation*" or "pulmonary inflammation*" or "pulmonic inflammation*")

4 1 or 2 or 3

5 TITLE("Buerger Gruetz syndrome" or "Burger Grutz syndrome" or cholesteremia* or cholesterinemia* or cholesterolemia* or "familial hyperbetalipoproteinaemia*" or "familial hyperbetalipoproteinemia*" or "familial hypercholesterolemic xanthomatos*" or "familial hyperlipoproteinaemia type ii" or "familial hyperlipoproteinemia type ii" or "harbitz mueller syndrome" or "hyper low density lipoproteinaemia*" or "hyper low density lipoproteinemia*" or hyperbetalipoproteinaemia* or hyperbetalipoproteinemia* or hypercholesteremia* or hypercholesterinaemia* or hypercholesterinemia* or hypercholesterolaemia* or "hypercholesterolaemic xanthomatos*" or hypercholesterolemia* or "hypercholesterolemic xanthomatos*" or hyperlipaemia* or hyperlipemia* or hyperlipidaemia* or hyperlipidemia* or hyperlipidemic or hyperlipoproteinaemia* or hyperlipoproteinemia* or hypertriglyceridaemia* or hypertriglyceridemia* or "hypertriglyceridemic waist" or "ldl receptor disorder" or lipaemia* or lipemia* or lipidaemia* or lipidemia* or "lipoid gout" or "mckusick 14389" or "mckusick 14430" or "mckusick 14440" or "mckusick 14575" or "tendinous xanthogranulomatos*" or "tendinous xanthomatos*" or "tendon xanthogranulomatos*" or "triglyceride storage disease" or triglyceridemia* or "xanthogranulomatosis tendinosum" or "xanthogranulomatosis tendinous" or "xanthoma tendinosum" or "xanthoma tuberosum" or "xanthoma tuberosum multiplex")

6 TITLE(Atorvastatin* or bervastatin* or cerivastatin* or compactin* or crilvastatin* or dalvastatin* or fluindostatin* or glenvastatin* or "HMG CoA reductase inhibitor" or "hmg coenzyme a reductase inhibitor" or "hmg-coa reductase inhibitor" or "hydroxymethylglutaryl coa reductase inhibitor" or "hydroxymethylglutaryl coenzyme A reductase inhibitor" or "hydroxymethylglutaryl-coa inhibitor" or "hydroxymethylglutaryl-coa reductase inhibitor" or "hydroxymethylglutaryl-coenzyme a inhibitor" or Lovastatin* or Meglutol or mevinolin* or "mevinolinic acid" or "monacolin J" or "monacolin L" or pitavastatin* or Pravastatin* or rosuvastatin* or Simvastatin* or statin* or statins or tenivastatin* or vastatin*)

7 TITLE(dyslipidemia or dyslipoproteinemia)

8 5 or 6 or 7

9 TITLE-ABS-KEY(surviv* or death* or mortalit* or fatalit*)

10 LANGUAGE(english)

11 TITLE-ABS-KEY((control* W/3 study) or (control* W/3 trial) or (randomized W/3 study) or (randomized W/3 trial) or (randomised W/3 study) or (randomised W/3 trial) or "pragmatic clinical trial" or (random* W/1 allocat*) or (doubl* W/1 blind*) or (doubl* W/1 mask*) or (singl* W/1 blind*) or (singl* W/1 mask*) or (tripl* W/1 blind*) or (tripl* W/1 mask*) or (trebl* W/1 blind*) or (trebl* W/1 mask*) or "latin square" or placebo* or nocebo* or multivariate or "comparative study" or "comparative survey" or "comparative analysis" or (intervention* W/2 study) or (intervention* W/2 trial) or "cross-sectional study" or "cross-sectional analysis" or "cross-sectional survey" or "cross-sectional design" or "prevalence study" or "prevalence analysis" or "prevalence survey" or "disease frequency study" or "disease frequency analysis" or "disease frequency survey" or crossover or "cross-over" or cohort* or "longitudinal study" or "longitudinal survey" or "longitudinal analysis" or "longitudinal evaluation" or longitudinal* or ((retrospective or "ex post facto") W/3 (study or survey or analysis or design)) or retrospectiv* or "prospective study" or "prospective survey" or "prospective analysis" or prospectiv* or

"concurrent study" or "concurrent survey" or "concurrent analysis" or "clinical study" or "clinical trial" or "case control study" or "case base study" or "case referrent study" or "case referent study" or "case referent study" or "case compeer study" or "case comparison study" or "matched case control" or "multicenter study" or "multi-center study" or "odds ratio" or "confidence interval" or "change analysis" or ((study or trial or random* or control*) and compar*))

12 4 and 8 and 9 and 10 and 11

13 TITLE-ABS-KEY((alpaca OR alpacas OR amphibian OR amphibians OR animal OR animals OR antelope OR armadillo OR armadillos OR avian OR baboon OR baboons OR beagle OR beagles OR bee OR bees OR bird OR birds OR bison OR bovine OR buffalo OR buffaloes OR buffalos OR "c elegans" OR "Caenorhabditis elegans" OR camel OR camels OR canine OR canines OR carp OR cats OR cattle OR chick OR chicken OR chickens OR chicks OR chimp OR chimpanze OR chimpanzees OR chimps OR cow OR cows OR "D melanogaster" OR "dairy calf" OR "dairy calves" OR deer OR dog OR dogs OR donkey OR donkeys OR drosophila OR "Drosophila melanogaster" OR duck OR duckling OR ducklings OR ducks OR equid OR equids OR equine OR equines OR feline OR felines OR ferret OR ferrets OR finch OR finches OR fish OR flatworm OR flatworms OR fox OR foxes OR frog OR frogs OR "fruit flies" OR "fruit fly" OR "G mellonella" OR "Galleria mellonella" OR geese OR gerbil OR gerbils OR goat OR goats OR goose OR gorilla OR gorillas OR hamster OR hamsters OR hare OR hares OR heifer OR heifers OR horse OR horses OR insect OR insects OR jellyfish OR kangaroo OR kangaroos OR kitten OR kittens OR lagomorph OR lagomorphs OR lamb OR lambs OR llama OR llamas OR macaque OR macaques OR macaw OR macaws OR marmoset OR marmosets OR mice OR minipig OR minipigs OR mink OR minks OR monkey OR monkeys OR mouse OR mule OR mules OR nematode OR nematodes OR octopus OR octopuses OR orangutan OR "orang-utan" OR orangutans OR "orang-utans" OR oxen OR parrot OR parrots OR pig OR pigeon OR pigeons OR piglet OR piglets OR pigs OR porcine OR primate OR primates OR quail OR rabbit OR rabbits OR rat OR rats OR reptile OR reptiles OR rodent OR rodents OR ruminant OR ruminants OR salmon OR sheep OR shrimp OR slug OR slugs OR swine OR tamarin OR tamarins OR toad OR toads OR trout OR urchin OR urchins OR vole OR voles OR waxworm OR waxworms OR worm OR worms OR xenopus OR "zebra fish" OR zebrafish) AND NOT (human OR humans or patient or patients))

14 12 and not 13

15 DOCTYPE(ab) OR DOCTYPE(ed) OR DOCTYPE(bk) OR DOCTYPE(er) OR DOCTYPE(no) OR DOCTYPE(sh)

16 14 and not 15

17 PMID(0*) OR PMID(1*) OR PMID(2*) OR PMID(3*) OR PMID(4*) OR PMID(5*) OR PMID(6*) OR PMID(7*) OR PMID(8*) OR PMID(9*)

18 16 and not 17

19 TITLE(("coronary arter*" W/3 occlusion) or (heart W/2 (infarct* or necrosis)) or "cardiac infarct*" or "cardial infarct*" or "cardiogenic shock" or "dressler syndrome" or "heart attack*" or "myocardial infarct*" or "myocardial stunning" or "myocardium infarct*" or "premonitory infarction sign" or "subendocardial infarct*") AND TITLE-ABS-KEY(acute)

20 18 and 19

21 TITLE(((heart or cardiac or myocardial) W/2 (failure or decompensat* or insufficienc* or incompetence)) or "cardio-renal syndrome*" or "cardiorenal syndrome*" or "paroxysmal dyspnea*" or "decompensatio cordis" or "insufficientia cardis")

22 (18 and not 20) and 21

23 18 and not (20 or 22)

SUPPLEMENT TABLE 1

Table 1. *International Classification of Diseases, Ninth Revision, Clinical Modification* codes for index conditions used in the study.

Diagnosis	*ICD-9-CM* Codes
Acute myocardial infarction	410.00, 410.01, 410.10, 410.11, 410.20, 410.21, 410.30, 410.31, 410.40, 410.41, 410.50, 410.51, 410.60, 410.61, 410.70, 410.71, 410.80, 410.81, 410.90, 410.91
Heart failure	402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428, 428.0, 428.1, 428.2, 428.20, 428.21, 428.22, 428.23, 428.3, 428.30, 428.31, 428.32, 428.33, 428.4, 428.40,

SUPPLEMENT TABLE 2. Characteristics of studies and participants included in meta-analysis

Condition	F/U	Study	Year	Design	N =	Mean age, year	Lipid type	End point	Covariates
AMI	≤30-day	Quintana et al[1]	2016	Retrospective cohort	1905		Hyperlipidemia	Death	sex, age, current smoking, parental history of premature cardiac death, general comorbidity, educational level, low disposable income, hypertension, hyperlipidemia, diabetes, overweight and obesity
		Cheng et al[2]	2015	observational study	724	68	LDL-C, TG-C	Death	Age, HTN, DM, smoking, family history of CAD, alcohol consumption, ESRD
		Reddy et al[3]	2015	Observational /Registry	115492	67	LDL-C, HDL-C	Death	Age, sex, race, HTN, previous CAD, DM, smoking, blood pressure, heart rate , previous PCI, previous CABG
		Current study	2018	Retrospective cohort	8,696	68	HLP	Death	Age, sex, race, BMI, length of stay, lipid levels, CAD, cancer, CKD, COPD, DM, HF, HTN, stroke, statin use
	≥ 2 years	Martin et al[4]	2015	Prospective Substudy	2465	58	RLP-C, IDL-C, VLDL3-C, VLDL-C	Death	Age, sex, race, education, insurance, history of CAD, Dyslipidemia, DM, blood pressure, CKD, HF, CAD, prior PCI, Prior CABG, Smoking, BMI, activity time, alcohol use
		Current study	2018	Retrospective cohort	8,696	68	HLP	Death	Age, sex, race, BMI, length of stay, lipid levels, CAD, cancer, CKD, COPD, DM, HF, HTN, stroke, statin use
Heart Failure	≥ 2 years	Afsarmanesh et al[5]	2006	Observational cohort	614	48	TC, LDL-C, HDL-C, TG-C	Death	Sex, age, HF etiology, NYHA, DM, smoking, HTN, BMI, LVEF
		Christ et al[6]	2005	Prospective cohort	422	50	LDL-C	Death	Age, sex, race, education, insurance, history of CAD, dyslipidemia, DM, blood pressure, CKD, HF, CAD, prior PCI, Prior CABG, Smoking, BMI, activity time, alcohol use
		Kahn et al[7]	2013	Observational study	2428	69.8	TC, LDL-C, HDL-C, TG-C	Death	Age, sex, HTN, DM, dyslipidemia, smoking, CKD, Cirrhosis, Statin use, BB use, ACE use, hydralazine use, nitrates use, Digoxin use, lipid level, sodium, hemoglobin, Creatinine, BUN, ALT, AST, albumin
		May et al[8]	2006	Registry	1641	65.5	TC, LDL-C, HDL-C, TG-C	Death	Age, sex, HTN, DM, family history of CAD, smoker, previous CAD, previous CVA, statin use, renal function ,BMI, ejection fraction
		Rauchhaus et al[9]	2003	Prospective cohort	303	62	TC	Death	Age, BMI, sodium, potassium, ESR, TNF, BUN, LVEF, lipid level, NYHA class, Cachexia, medication use (loop diuretics, ACE inhibitor, calcium channel blocker, digoxin, amiodarone, BB, lipid lowering, aspirin)

Abbreviations: ACE, angiotensin-converting enzyme; ALT, alanine aminotransferase; AMI, acute myocardial infarction; AST, aspartate aminotransferase; BB, beta blocker; BMI, body mass index; BNP, B-type natriuretic peptide; BUN, blood urea nitrogen; CABG, Coronary artery bypass grafting; CAD, coronary artery disease; CKD, chronic kidney disease; COPD, Chronic Obstructive Pulmonary Disease; CVA, cerebrovascular accident; DM, Diabetes mellitus; ESRD, end stage renal disease; F/U, follow up; HDL-C, high-density lipoprotein-cholesterol; HF, heart failure; HLP, hyperlipidemia; HTN, hypertension; IDL-C, Intermediate-density lipoprotein-cholesterol; LDL-C, low-density lipoprotein-cholesterol; LVEF, left ventricular ejection fraction; N=, number of patients; NYHA, New York Heart Association; PCI, percutaneous coronary intervention; RLP-C , remnant-like particles-cholesterol; TC, total cholesterol; TG-C, triglyceride-cholesterol; TNF, tumor necrosis factor; VLDL-C, very-low-density lipoprotein-cholesterol.

References

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3. Reddy VS, Bui QT, Jacobs JR, et al. Relationship between serum low-density lipoprotein cholesterol and in-hospital mortality following acute myocardial infarction (the lipid paradox). *Am J Cardiol.* 2015;115(5):557-562.
4. Martin SS, Faridi KF, Joshi PH, et al. Remnant Lipoprotein Cholesterol and Mortality After Acute Myocardial Infarction: Further Evidence for a Hypercholesterolemia Paradox From the TRIUMPH Registry. *Clin Cardiol.* 2015;38(11):660-667.
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9. Rauchhaus M, Clark AL, Doehner W, et al. The relationship between cholesterol and survival in patients with chronic heart failure. *J Am Coll Cardiol.* 2003;42(11):1933-1940.

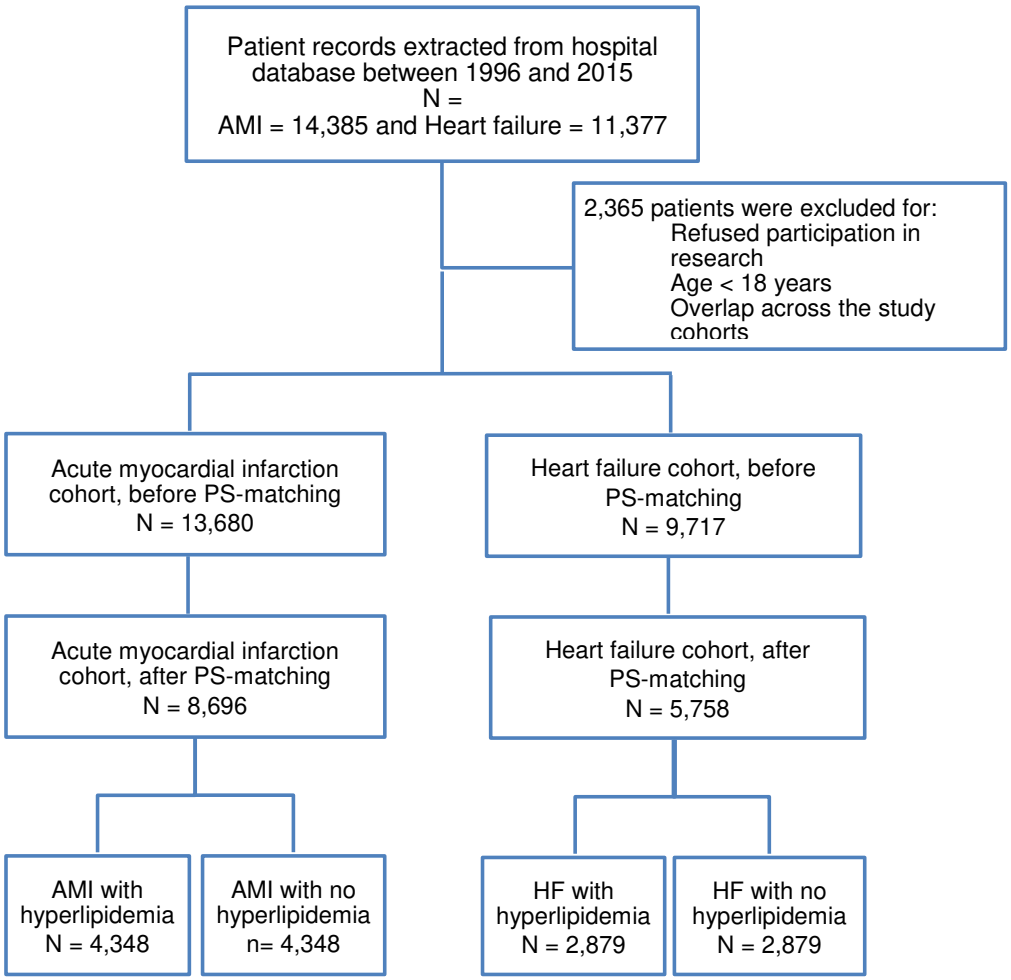
SUPPLEMENT TABLE 3. Risk of Bias Assessment (Newcastle-Ottawa Scale

			Selection				Compatibility		Outcome			
Condition	Study	Year	S1	S2	S3	S4	C1	C2	O1	O2	O3	Quality
Acute Myocardial Infarction	Quintana et al[1]	2016	*	*	*		*	*	*	*	*	8
	Cheng et al[1]	2015	*	*	*		*	*	*			6
	Martin et al[2]	2015	*	*	*		*	*	*	*		7
	Reddy et al[3]	2015	*	*	*		*	*	*	*		7
Heart failure	Afsarmanesh et al[4]	2006	*	*	*		*	*	*	*	*	8
	Christ et al[5]	2005		*	*		*		*	*		5
	Kahn et al[6]	2013	*	*	*		*	*	*	*	*	8
	May et al[7]	2006	*	*	*	*	*	*	*	*	*	9
	Rauchhaus et al[8]	2003	*	*	*		*	*	*	*		7

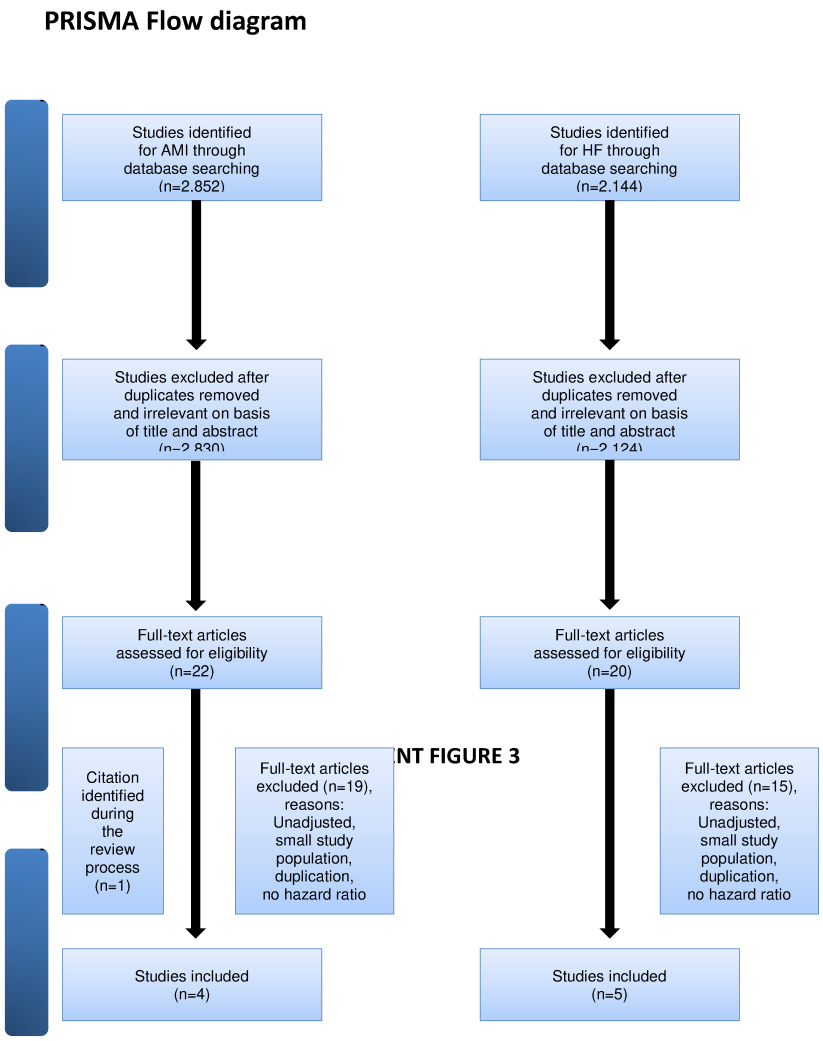
NOTE: S1 = Representativeness of the exposed cohort. S2 = Selection of the non-exposed cohort. S3 = Ascertainment of exposure. S4 = Demonstration that the outcome of interest was not present at the start of the study. C1 = Comparability of the cohort on the basis of design. C2 = Comparability of the cohort on the basis of analysis. O1 = Assessment of outcome. O2 = was the follow-up long enough for outcomes to occur? O3 = Adequacy of the follow-up of cohorts.

SUPPLEMENT FIGURE 1

Flow diagram. STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) flow diagram of the process of selection of study cohorts from Mayo Clinic Hospital Data Base

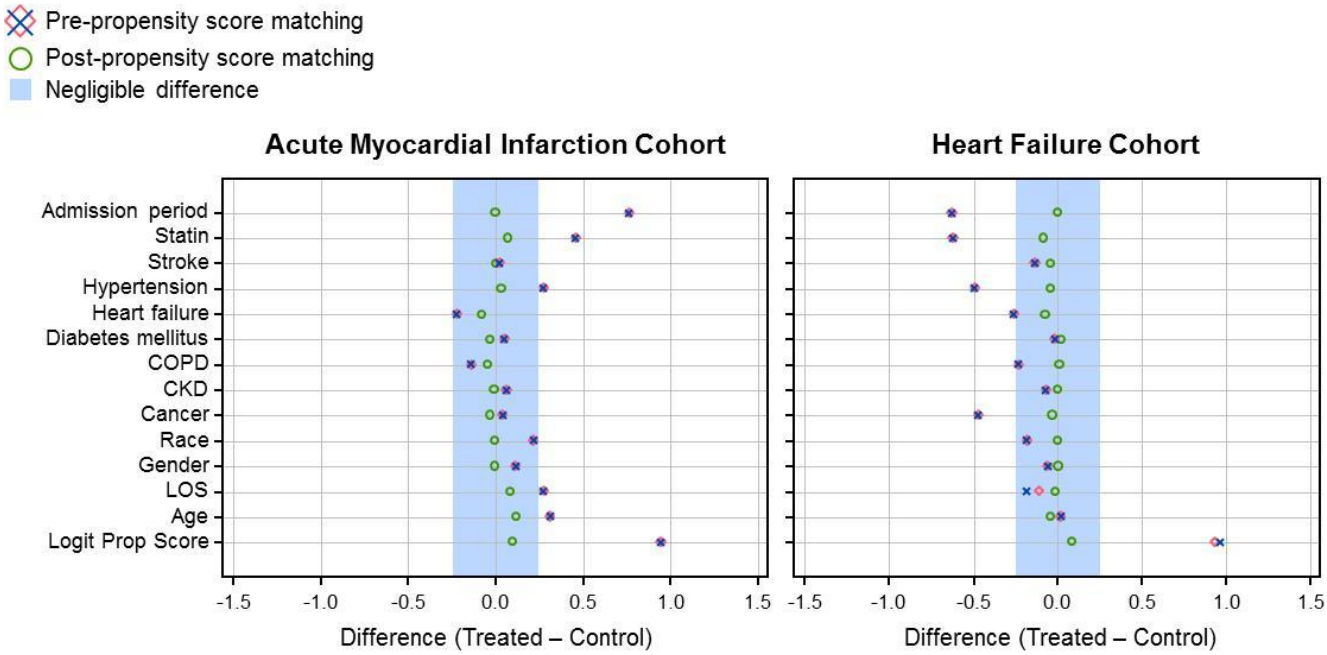


SUPPLEMENT FIGURE 2



NT FIGURE 3

Love plot showing standardized differences for baseline covariates comparing original propensity-score unmatched to propensity-score matched samples, acute myocardial infarction cohort (left panel) and heart failure cohort (right panel)



Abbreviations: CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease; LOS, length of hospital stay

PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Title:

Association between hyperlipidemia and mortality after incident acute myocardial infarction or acute decompensated heart failure: A propensity score matched cohort study and a meta-analysis

Journal: *BMJ Open*

Original title of the manuscript: Hyperlipidemia is associated with lower mortality after incident acute myocardial infarction or acute decompensated heart failure: A propensity matched cohort study and a meta-analysis

Manuscript ID #: bmjopen-2018-028638

Authors: Mohammed Yousufuddin, Paul Takahashi, Brittny Major, Eimad M. Ahmmad, Hossam M. Al-Zu'bi, Jessica Shultz,Taylor Doyle, Kelsey Jensen, Umesh Sharma, Zhen Wang, Vinaya Simha, Mohammad H. Murad

Section and topic	Item No	Checklist item	Page
ADMINISTRATIVE INFORMATION			
Title:			
Identification	1a	Identify the report as a protocol of a systematic review	2
Update	1b	If the protocol is for an update of a previous systematic review, identify as such n/a	
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number n/a	
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	18
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	n/a
Support:			
Sources	5a	Indicate sources of financial or other support for the review	18
Sponsor	5b	Provide name for the review funder and/or sponsor n/a	
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	18
INTRODUCTION			

Rationale	6	Describe the rationale for the review in the context of what is already known	2
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	2
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	7
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	6, 7
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	6
Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	6, 7
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	7
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	6, 7
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	7
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	7
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	7
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	6, 7
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, 6,7 methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)	
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup a nalyses, meta-regression)	9
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	9
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	6, 7
Confidence in cumulative	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	9

evidence

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015 Jan 2;349(jan02 1):g7647.

STROBE Statement

Checklist of items that is included

Title:

Association between hyperlipidemia and mortality after incident acute myocardial infarction or acute decompensated heart failure: A propensity score matched cohort study and a meta-analysis

Journal: *BMJ Open*
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Authors: Mohammed Yousufuddin, Paul Takahashi, Brittny Major, Eimad M. Ahmmad, Hossam M. Al-Zu'bi, Jessica Shultz,Taylor Doyle, Kelsey Jensen, Umesh Sharma, Zhen Wang, Vinaya Simha, Mohammad H. Murad

Section/Topic	Item No	Recommendation	Reported on Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3, 4
Objectives	3	State specific objectives, including any pre-specified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	5,6
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	6,8
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6,7,8
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6,7,8
Bias	9	Describe any efforts to address potential sources of bias	8

Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5,6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7,8,9
		(*b*) Describe any methods used to examine subgroups and interactions	8,9
		(*c*) Explain how missing data were addressed	8,9
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	8,9
		(*e*) Describe any sensitivity analyses	8,9

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9,10
		(b) Indicate number of participants with missing data for each variable of interest	9
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	10
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	9,10
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	10
		Cross-sectional study—Report numbers of outcome events or summary measures	10
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10, 11,12
		(*b*) Report category boundaries when continuous variables were categorized	9, 10
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	11, 12
Discussion			
Key results	18	Summarize key results with reference to study objectives	13
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16

Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	16
Generalizability	21	Discuss the generalizability (external validity) of the study results	16
Other Information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	18

**Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.*

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.